Appl. No. 10/003,911
Amdt. Dated December 11, 2003
Reply of Office action of August 15, 2003

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An apparatus for applying discrete components onto a moving substrate, said apparatus including:

a first rotatable drive member;

at least a second rotatable drive member which is substantially coaxial with said first drive member;

a first servo motor connected to rotate said first drive member, wherein said first servo motor can provide a torque of at least about 50 Newton-meter;

at least a second servo motor connected to rotate said second drive member, wherein said second servo motor can provide a torque of at least about 50 Newton-meter;

a first transfer puck driven by said first rotatable drive member;

at least a second transfer puck driven by said second rotatable drive member;

a first electronic drive connected to said first servo motor, said first electronic drive configured to selectively move said first transfer puck at a first, pickup speed and at least a second, deposit speed and wherein said first servo motor and said first electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said first transfer puck;

at least a second electronic drive connected to said second servo motor, said second electronic drive configured to selectively move said second transfer puck at said first pickup speed and at said second deposit speed and wherein said second servo motor and said second electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said second transfer puck.

2. (original) An apparatus as recited in claim 1, further including a transport mechanism for moving said substrate at said deposit speed.

3. (original) An apparatus as recited in claim 1, wherein said first transfer puck is configured to carry a first discrete component for placement onto said moving substrate; and said second transfer puck is configured to carry at least a second discrete component for placement onto said moving substrate.

4. (original) An apparatus as recited in claim 1, wherein said first rotatable drive member and at least said second rotatable drive member are substantially concentric.

5. (original) An apparatus as recited in claim 1, wherein said first transfer puck is operatively connected to said first rotatable drive member with a first, radially extending arm member; and said second transfer puck is operatively connected to said second rotatable drive member with a second, radially extending arm member.

6. (original) An apparatus as recited in claim 1, wherein

said first servo motor is configured to operatively move said first transfer puck along a predetermined rotational path; and

said second servo motor is configured to operatively move, in sequence, said second transfer puck along said predetermined rotational path substantially without contacting said second transfer puck against said first transfer puck.

7. (original) An apparatus as recited in claim 1, further including a synchronizer which can maintain a selected sequence of relative separation distances between said first transfer puck and said second transfer puck during their movements along said predetermined rotational path.

8. (original) An apparatus as recited in claim 1, wherein said first servo motor and said first electronic drive are configured to move said first transfer puck to provide a deposit speed of at least about 6 m/sec .

9. (Canceled)

10. (Canceled)

11. (original) An apparatus as recited in claim 1, wherein said first servo motor and said first electronic drive can cooperatively provide said first, pickup speed for a pickup dwell interval which substantially corresponds to one product repeat.

12. (original) An apparatus as recited in claim 1, wherein said second servo motor and said second electronic drive can cooperatively provide said first, pickup speed for a pickup dwell interval which substantially corresponds to one product repeat.

13. (original) An apparatus as recited in claim 1, wherein said second, deposit speed differs from said first, pickup speed to provide a deposit/pick-up speed ratio of at least about 1.5:1.

14. (Canceled)

15. (original) An apparatus as recited in claim 1, further including a retaining mechanism configured to releasably hold a discrete component on said first transfer puck.

16. (original) An apparatus as recited in claim 15, wherein said retaining mechanism includes a vacuum device.

17. (original) An apparatus as recited in claim 1, further including:
a third rotatable drive member which is substantially coaxial with said first drive member;

a third servo motor connected to rotate said third drive member;

a third transfer puck driven by said first rotatable drive member; and

a third electronic drive connected to said third servo motor, said third electronic drive configured to selectively move said third transfer puck at said first pickup speed and at said second deposit speed.

18. (Canceled)

19. (currently amended) A method for applying discrete components onto a moving substrate, said method including:

a providing of a first rotatable drive member;

a providing at least a second rotatable drive member which is substantially coaxial with said first drive member;

a connecting of a first servo motor to rotate said first drive member, wherein said first servo motor can provide a torque of at least about 50 Newton-meter;

a connecting of at least a second servo motor to rotate said second drive member, wherein said second servo motor can provide a torque of at least about 50 Newton-meter;

a driving of a first transfer puck with said first rotatable drive member;

a driving of at least a second transfer puck with said second rotatable drive member;

a connecting of a first electronic drive to said first servo motor, said first electronic drive configured to selectively move said first transfer puck at a first pickup speed and at least a second deposit speed and wherein said first servo motor and said first electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said first transfer puck;

a connecting of at least a second electronic drive to said second servo motor, said second electronic drive configured to selectively move said second transfer puck at said first pickup speed and at said second deposit speed and wherein said second servo motor and said second electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said second transfer puck;

a receiving of at least one of said discrete components with each of said first transfer puck and said second transfer puck at said first pick up speed;

an applying of said at least of said discrete components with each of said first transfer puck and said second transfer puck at said second deposit speed onto said moving substrate.

20. (currently amended) A method for applying discrete components onto a moving substrate, said method including:

a rotating of a first rotatable drive member with a first servo motor, wherein said first servo motor can provide a torque of at least about 50 Newton-meter;

a providing of at least a second rotatable drive member which is substantially coaxial with said first drive member;

a rotating of said second rotatable drive member with a second servo motor, wherein said second servo motor can provide a torque of at least about 50 Newton-meter;

a moving of a first transfer puck with said first rotatable drive member, said first transfer puck configured to place a first discrete component onto said moving substrate;

a moving of at least a second transfer puck with said second rotatable drive member, said second transfer puck configured to place a second discrete component onto said moving substrate;

a connecting of a first electronic drive to said first servo motor, said first electronic drive configured to selectively move said first transfer puck at a first pickup speed and at least a second deposit speed and wherein said first servo motor and said first electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said first transfer puck;

a connecting of at least a second electronic drive to said second servo motor, said second electronic drive configured to selectively move said second transfer puck at said first pickup speed and at said second deposit speed and wherein said second servo motor

and said second electronic drive can cooperatively provide an angular acceleration of at least about 600 radian/sec^2 to said second transfer puck;

a receiving of at least one of said discrete components with each of said first transfer puck and said second transfer puck at said first pick up speed;

an applying of said at least of said discrete components with each of said first transfer puck and said second transfer puck at said second deposit speed onto said moving substrate.

21. (Canceled)

22. (original) A method as recited in claim 19, further including a configuring of said first servo motor to provide a torque of at least about 100 Newton-meter.

23. (original) A method as recited in claim 19, further including a configuring of said first servo motor and said first electronic drive to provide a deposit/pick-up speed ratio which is at least about 1.5:1.

24. (Canceled)

25. (original) A method as recited in claim 19, further including

an operatively moving of said first transfer puck along a predetermined rotational path; and

an operatively moving of said second transfer puck, in sequence, along said predetermined rotational path substantially without contacting said second transfer puck against said first transfer puck.

26. (original) A method as recited in claim 19, further including

a providing of a third rotatable drive member which is substantially coaxial with said first drive member;

a connecting of a third servo motor to rotate said third drive member;

a driving of a third transfer puck with said third rotatable drive member;

a connecting of a third electronic drive to said third servo motor, said third electronic drive configured to selectively move said third transfer puck at said first pickup speed and at least said second deposit speed.

27. (original) A method as recited in claim 26, further including

an operatively moving of said first transfer puck along a predetermined rotational path;

an operatively moving of said second transfer puck, in sequence, along said predetermined rotational path substantially without contacting said second transfer puck against said first transfer puck; and

an operatively moving of said third transfer puck, in sequence, along said predetermined rotational path substantially without contacting said third transfer puck against said first or second transfer pucks.

28. (currently amended) A method as recited in claim [[21]]20, further including

a configuring of said moving of said first transfer puck to provide an orbital path length of said first transfer puck; and

a configuring of said moving of said first transfer puck to correspond to a speed profile which provides a single-cycle motion-area value that substantially equals said orbital path length of said first transfer puck.